IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of: **Yoshiharu MORI et al.** Group Art Unit: **2882**

Application No.: **10/532,735** Examiner: **Unknown**

Filed: **April 25, 2005** Confirmation No.: **8968**

For: **ELECTRON ACCELERATOR AND RADIATION MEDICAL TREATMENT APPARATUS USING THE SAME**

Attorney Docket Number: **052484**
Customer Number: **38834**

SUBMISSION OF ENGLISH TRANSLATION OF IPER

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

July 25, 2005

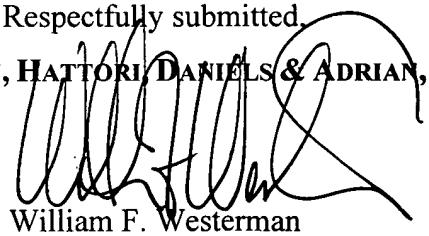
Sir:

Submitted herewith is an English translation of the International Preliminary Examination Report for the above-identified U.S. patent application.

If any additional fees are due in connection with this submission, please charge our Deposit Account No. 50-2866.

Respectfully submitted,

WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP



William F. Westerman
Attorney for Applicants
Registration No. 29,988
Telephone: (202) 822-1100
Facsimile: (202) 822-1111

WFW/dlt

PATENT COOPERATION TREATY

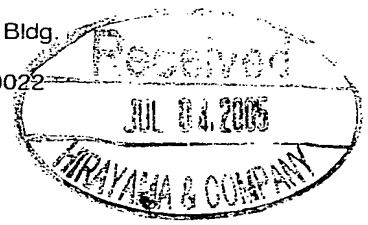
From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF TRANSMITTAL
OF COPIES OF TRANSLATION
OF THE INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY
(CHAPTER I OR CHAPTER II
OF THE PATENT COOPERATION TREATY)
(PCT Rule 72.2)

To:

HIRAYAMA, Kazuyuki
6th Floor, Shinjukugyoen Bldg.
2-3-10, Shinjuku
Shinjuku-ku, Tokyo 160-0022
JAPON



Date of mailing *(day/month/year)* 30 June 2005 (30.06.2005)	
Applicant's or agent's file reference PCT087JST	**IMPORTANT NOTIFICATION**
International application No. PCT/JP2003/013656	International filing date *(day/month/year)* 24 October 2003 (24.10.2003)
Applicant JAPAN SCIENCE AND TECHNOLOGY AGENCY et al	

1. **Transmittal of the translation to the applicant.**

   The International Bureau transmits herewith a copy of the English translation made by the International Bureau of the international preliminary examination report established by the International Preliminary Examining Authority.

2. **Transmittal of the copy of the translation to the elected Offices.**

   The International Bureau notifies the applicant that copies of that translation have been transmitted to the following elected Offices requiring such translation:

   CA, CN, EP, KR

   The following elected Offices, having waived the requirement for such a transmittal at this time, will receive copies of that translation from the International Bureau only upon their request:

   JP, US

3. **Reminder regarding translation into (one of) the official language(s) of the elected Office(s).**

   The applicant is reminded that, where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report.

   It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned (Rule 74.1). See Volume II of the PCT Applicant's Guide for further details.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Masashi Honda
Facsimile No.+41 22 740 14 35	Facsimile No.+41 22 338 70 10

Translation

PATENT COOPERATION TREATY

PCT/JP2003/013656

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PCT087JST	FOR FURTHER ACTION	See Form PCT/IPEA/416
International application No. PCT/JP2003/013656	International filing date (*day/month/year*) 24 October 2003 (24.10.2003)	Priority date (*day/month/year*) 25 October 2002 (25.10.2002)
International Patent Classification (IPC) or national classification and IPC H05H 13/08, A61N 5/10		
Applicant JAPAN SCIENCE AND TECHNOLOGY AGENCY		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising:

   a. ☒ *(sent to the applicant and to the International Bureau)* a total of 13 sheets, as follows:

      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

- ☒ Box No. I Basis of the report
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

Date of submission of the demand	Date of completion of this report
07 April 2004 (07.04.2004)	07 December 2004 (07.12.2004)
Name and mailing address of the IPEA/JP Facsimile No.	Authorized officer Telephone No.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/JP2003/013656

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on translations from the original language into the following language _____, which is language of a translation furnished for the purpose of:

☐ international search (under Rules 12.3 and 23.1(b))

☐ publication of the international application (under Rule 12.4)

☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

☐ The international application as originally filed/furnished

☒ the description:

pages 1-3, 7-20, as originally filed/furnished

pages* 4-6/1 received by this Authority on 23 July 2004 (23.07.2004)

pages* _____ received by this Authority on _____

☒ the claims:

pages 4, 7, 9-11, 14, 15, 17, as originally filed/furnished

pages* _____, as amended (together with any statement) under Article 19

pages* 1-3, 5, 8, 12, 13, 16 received by this Authority on 23 July 2004 (23.07.2004)

pages* _____ received by this Authority on _____

☒ the drawings:

pages 1-20, as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☒ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☒ the claims, Nos. 6

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/JP 03/13656

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-5, 7-17	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	1-5, 7-17	NO
Industrial applicability (IA)	Claims	1-5, 7-17	YES
	Claims		NO

2. Citations and explanations

Claims 1, 3-5, 7 and 13-17

Document 2 (Yuzuru NAKANO and KEN FFAG Group KEK, "150 MeV Fixed Field Alternating Gradient (FFAG) Accelerator," September 2002, Genshikaku Kenkyu, Vol. 47, No. 4, pp. 91-101) presents a fixed field type strong focusing accelerator with a closed magnetic circuit which comprises focusing electromagnets and dispersion electromagnets that are provided on both sides of said focusing electromagnets.

Document 3 (F. T. COLE, "Electron Model Fixed Field Alternating Gradient Accelerator," The Review of Scientific Instruments, Vol. 28, No. 6, June 1957) presents a fixed field type strong focusing electron accelerator.

Document 5 (JP 6-54917 A (NEC Corp.), 01 March 1994) discloses prior art technology which pertains to the positioning of an internal target for generating X-rays, and discloses an electron accelerator that is capable of selectively extracting the accelerated electron beam and the X-rays.

Document 7 (JP 7-320680 A (Nisshin High-Voltage Co., Ltd.), 08 December 1995) discloses a coil for electron beam scanning that is used in a electron beam irradiation device, wherein the secondary coil is segmented and the

power supply is controlled.

Document 11 (JP 2-201898 A (Mitsubishi Electric Corp.), 10 August 1990), document 12 (JP 8-148327 A (Hitachi, Ltd.), 07 June 1996) and document 13 (JP 2000-82599 A (Mitsubishi Electric Corp.), 21 March 2000) disclose electromagnets for accelerators, wherein the winding portions of the electromagnets have a partially wound structure.

In the light of document 3, it would be easy for a person skilled in the art to conceive of accelerating electrons by means of the fixed field type strong focusing accelerator that is disclosed in document 2; furthermore, it would be easy for a person skilled in the art to conceive of configuring the electron accelerator so that the internal target for generating X-rays is disposed immediately in front of the electron beam transport unit and so that it is possible to selectively extract the accelerated electron beam and the X-rays in the electron accelerator in the light of document 5.

In addition, it would be easy for a person skilled in the art to conceive of providing the electron accelerator with a configuration for scanning with an electron beam in the light of document 7; moreover, it would be easy for a person skilled in the art to conceive of configuring so that the winding parts of the electromagnets that constitute the strong focusing electromagnets in the fixed field type strong focusing electron accelerator have a partially wound structure in the light of documents 11-13. Therein, the distribution of the magnetic field that results from the control in question can be determined arbitrarily, as necessary.

In addition, a person skilled in the art could arbitrarily configure so that the acceleration device employs a high-frequency acceleration method or an inductive acceleration method, or so that a pinhole slit

is provided to the scanning unit, as necessary.

Consequently, the inventions that are set forth in claims 1, 3-5, 7 and 13-17 do not involve an inventive step in the light of documents 2, 3, 5, 7 and 11-13.

Claims 2 and 8-11

Document 8 (JP 2002-217000 A (Hitachi, Ltd.), 02 August 2002), document 9 (JP 2002-184600 A (Sumitomo Heavy Ind., Ltd.), 28 June 2002) and document 10 (JP 2002-141198 A (Sumitomo Heavy Ind., Ltd.), 17 May 2002) disclose electromagnets for correcting the trajectory of a beam in an accelerator that accelerates electron beams or the like.

In the light of documents 8-10, it would be easy for a person skilled in the art to conceive of configuring a fixed field type strong focusing electron accelerator so that electromagnets for correcting the trajectory of a beam are provided in the vicinity of the electron beam output unit and in the vicinity of the electron beam input unit; furthermore, a person skilled in the art could arbitrarily provide the electron beam input unit of the electron accelerator with an electron gun and electromagnets for changing the trajectory of the electron beam from the electron gun, as necessary.

In addition, a person skilled in the art could configure so that the electromagnets for correcting the trajectory of the beam are positioned at locations where the phase of the electromagnets for correcting the trajectory of the beam is delayed by [π/2 radian] in relation to the phase of the septum electromagnets, and so that the electromagnets for correcting the trajectory of the beam that are positioned in the vicinity of the output unit and the electromagnets for correcting the trajectory of the beam that are positioned in the vicinity of the input unit exhibit a phase relationship of [nπ], as

appropriate.

Consequently, the inventions that are set forth in claims 2 and 8-11 do not involve an inventive step in the light of documents 2, 3, 5 and 7-13.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/JP 03/13656

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

The disclosures of claims 7, 8, 10 and 17 cite claim 6, which was deleted by the amendments.